Truly Non-Cooperative Games: A Unified Theory

Matt Funk

University of Malta

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TRULY NON-COOPERATIVE GAMES: A UNFIED THEORY

Fig. 1. — *A Conversation with Willard Boyle* (1)[$]

MATT FUNK, FLS[£]
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$ [A] Canadian… won a Nobel Prize Tuesday. But physicist Willard Boyle had to move to the U.S. to do his cutting-edge work.

Dr Boyle… warned that managers need to give scientists leeway to come up with the kinds of transformative inventions that are too often stifled by paperwork and red tape.

What scientists face today is 'almost disgraceful. Do you think… George Smith and I ever wrote a business plan [or "ethics review board" requests, or wasted time slaving over academic journal formalisms]?… You don't have time to do that kind of baloney.'

Early in his career, Dr Boyle got a job at Bell Laboratories, a private research lab in New Jersey where he was given free rein to pursue his interests. He and Dr Smith, who is American, came up with their invention while sketching possibilities on a blackboard in October, 1969.

'There was something about that institution,' Dr Boyle told *The Chronicle-Herald* in Halifax…

'I guess it was the management and the style and the general environment of the place.…'

Dr Boyle… said policy-makers should look at the practices of think tanks that produce Nobel Prize-winners…, instead of 'pouring money randomly into [things], expecting the same results.'

'Usually… management people or… politicians haven't got the foggiest idea of what science is all about.' What is needed is 'an appreciation for the free will, free spirit of scientists. Give them a chance to do the things they want to do' (2 ; *cf* 3 ; §3).

£ The writer's object in putting forward his views in the present imperfect manner is to submit them to the test of other minds, and to be made aware of all the facts supposed to be inconsistent with them. As his hypothesis is one which claims acceptance solely as explaining and connecting facts which exist in nature, he expects facts alone to be brought to disprove it; not *à-priori* arguments against its probability (4).

ABSTRACT

This dissertation introduces *Truly Non-cooperative Games* – axioms and complimentary negotiation models developed to analyse the human *Struggle for Life* (*cf* 5-11) – and presents *The Principle of Relative Insularity*, a unified theory of value which unites economics, astrophysics, and biology. In brief, we discover that, *reductio ad absurdum*, value is a derivative function of relative insularity: $V=f'(I_R)$.[$]

§1. PROBLEM SITUATION[£]

It appears Aristotle may have been amongst the first to search for a theory of value (14), and this quest has kept true problem-solvers awake at night ever since:

> In economics the most fundamental of these central problems is the theory of value. The theory of value must explain how the comparative values of different goods and services are established. Until that problem is solved, it is not possible to analyse for scientific purposes what will be produced and in what quantities, how the resources will be employed in producing the menu of outputs, and how the resources will be valued (15).

And thus it remains impossible to analyse a myriad of related problems, including sustainable economic development, global warming, warfighting, asteroids, supervolcanoes, reserve currencies, and value at risk (VaR). Indeed, "insufficient consideration of [these] circumstances lie at the root of [our present] difficulties" (16).

§2. HYPOTHESIS

Nash developed fruitful equilibrium points (17 ; *cf* 18) and non-cooperative games (19), emphasizing the existence of

> situations in economics or international politics in which, effectively, a group of interests are involved in a non-cooperative game without being aware of it; the non-awareness [making] the situation truly non-cooperative (19).

Our theory (20-24), in contradistinction, highlights the truly non-cooperative nature of *every situation in the universe*. Thus our realistic, asymmetric games (25) share attributes with games against nature (26) and games with incomplete information (27).

> But as the exposition of the entire group of considerations would be rather difficult to follow, only a few quite elementary reflexions will be given…, from which the reader will readily be able to inform himself [*i.e.*, 20-24] as to the suppositions of the theory and its line of thought (28).

Two players, *Relatively Insular States* (RIS) and *Globalized Economic Military Superpowers* (GEMS) fight for survival (*cf* 5-11); axioms (20-21) inform strategy: RIS = *Maximum Ecological Protection,* GEMS = *Maximum Economic Development*. Equilibrium is attained when players pursue rational, opposing *Evolutionarily Stable Strategy* (ESS) (22) by employing *The Principle of Relative Insularity*. Strategic equilibrium yields rational, mutually beneficial behaviour, maximum planetary insularity, and thus maximizes value (22). Furthermore, strategic transparency facilitates rational play: If all players recognize the value of respective, opposing – *yet inherently complimentary and, perhaps ironically, ultimately cooperative* – strategies, then all players act, communicate, negotiate, and cooperate more rationally, peacefully, and thus economic development is optimized and human survival prospects are maximized (22).

Alas, "nothing seems less wanted than a simple solution to an age-old… problem" (30); thus we shall emphasize and contextualize: Ulam once challenged Samuelson to name a social theory which was nontrivial and true; Samuelson countered with Ricardo's theory of comparative advantage:

> That it is logically true need not be argued before a mathematician; that is not trivial is attested by the thousands of … men who have never been able to grasp the doctrine for themselves or to believe it after it was explained to them (31).

As a sailor who has encountered countless intelligent islanders unable to grasp this doctrine (22), I'm inclined to

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[$] Value is the essence of things in economics. Its laws are to political economy what the law of gravity is to mechanics. Every great system of political economy up till now has formulated its own peculiar view on value as the ultimate foundation in theory of its applications to practical life, and no new effort at reform can have laid an adequate foundation for these applications if it cannot support them on a new and more perfect theory of value (12).

[£] When we propose a theory… we also propose, or try to understand, its logical implications; that is, all those statements which follow from it. But this… is a hopeless task: there is an infinity of unforeseeable nontrivial statements belonging to the informative content of any theory, and an exactly corresponding infinity of statements belonging to its logical content. We can therefore never know or understand all the implications of any theory, or its full significance.

…Understanding a theory is always an infinite task, and… theories can in principle be understood better and better. …If we wish to understand a theory better, what we have to do first is to discover its logical relation to those existing problems and existing theories which constitute what we may call the 'problem situation'.

Admittedly, we also try to look ahead: we try to discover new problems raised by our theory. But the task is infinite, and can never be completed (13).

agree, but a stronger rebuttal to Ulam's challenge, *On the Origin of Mass Extinctions: Darwin's Nontrivial Error* (24), requires our immediate attention.

Furthermore, the "denaturalization of economics" (32), logic of war (33), true nature economic power (34), Hardin's error (35-36), and Popper's solution to Hume's problem of induction (37-38) require patient and careful consideration as well. Indeed, these nontrivial truths (32-38) may help us grasp why our in-communicative (39) and thus truly uncooperative "prisoners" (40) – *the unknown and unknowable future* (21) – beg us to reconsider fashionable (but false) theories, plead for international cooperation (24), and implore us to consider a revolutionary approach to science.[$]

Which brings us to our final reflexion:

> In 1452 in Mainz, Germany, a goldsmith named Johannes Gutenberg put ink to movable type and.... Gutenberg's invention was a piece of technology that made printing... simple and inexpensive. His first [book] was a bible. Venture capitalists, if there were such a thing in fifteenth-century Germany, might have looked at Gutenberg's... invention and seen a way to make cheaper bibles. 'Let's pour some money into Gutenberg's printing press and in a few years we can take over the whole Bible business,' they might... have concluded. If they had done so, however, they would have missed the entire point... The printing press was not about cheaper bibles, it was a technological revolution that made it possible for anyone with an idea to publish anything. [It] changed our world. It led to an explosion of knowledge, of learning, of ideas. It brought down Medieval Europe..., crushed the Power of Kings, and gave rise to the middle class, manufacturing, and trade. It set off the Enlightenment and created... the world we inhabit today. We are, in effect, the direct descendents of the Gutenberg Revolution. The US Constitution is a written, printed document. It enumerates our rights and how our country is supposed to work. Yet the very first Amendment..., the very core of the Bill of Rights does not say 'You have the right to vote' or 'You have the right to be free.' Instead, it says, 'Congress Shall Make No Law Abridging a Free Press.' That is because [our] Founding Fathers... understood that the primary bulwark of a free society is a free press (43).

The internet represents a technological advance of equal wonder. It has spawned revolutions of equal significance. Indeed, this world-wide-web has linked and liberated true problem-solvers (44), thereby helping to deliver (*i.e.*, 20-24 ; 34-35) this revolutionary theory of value to you: $V=f'(I_R)$.[£]

§3. A NOTE ON METHOD

Fellow sailor George Smith was recently commended for his 3-page PhD thesis (46); this compliment intrigued me.

But profound truths (2) uttered by another sailor (and fighter pilot) intrigued me even more; in fact, they inspired me to chart a course for Halifax, because the non-existence of scientific method (2 ; 10 ; 13 ; 30 ; 32 ; 36-38 ; 44-48) is yet another nontrivial affair; although we did indeed discuss this difficult and illusive truth at great length (1) , I'll merely relate one inspirational remark:

> It's always a bad sign when people come into meetings with stacks under their arms and start handing you piles to read. I hired Smith because he was able to communicate something very complex and very important in just three pages (1).

Since economics was created to promote national interests (49), it comes of no surprise that most real problems (2 ; 4-7 ; 11 ; 16 ; 20-24 ; 28 ; 30 ; 32-38 ; 41-42 ; 44-48 ; 50-52) remain outside the non-existent subject of economics (47), and thus "economics" remains unable to analyze and inform strategy regarding mission-critical global threats. And that's exactly why we're not really playing games here, afterall.[†]

$ One can argue that all environments are hostile, and that death and extinction are probable events, while survival is improbable.... In my opinion, this problem may well be used as the framework on which to build the teaching of [science] (41 ; *cf* 42).

£ Internet publishing reduces the stifling impact of the refereeing process on the papers accepted and submitted to journals. ...Scholars are less bound to devote a large part of their time and effort on formalisms. They have more leeway to concentrate on matters of content.... The dominance of orthodoxy is reduced (45).

† What Mises taught us in his writings, ...lectures, [and] seminars, was that economics... is primordially, crucially important. Economics is not an intellectual game. Economics is deadly serious. The very future of mankind... depends... upon widespread understanding of... the principles of economics.

This is a lesson which is located almost entirely outside economics proper. But all Mises' work depended ultimately upon this tenet. Almost invariably, a scientist is motivated by values not strictly part of the science itself. The lust for fame, for material rewards—even the pure love of truth—these goals may possibly be fulfilled by scientific success, but are themselves not... worthwhile goals. What drove Mises, what accounted for his passionate dedication, his ability to calmly ignore the sneers of, and the isolation imposed by academic contemporaries, was his conviction that the survival of mankind depends on the development and dissemination of... economics....

Economics is not simply a matter of intellectual problem solving, like a challenging crossword puzzle, but literally a matter of the life or death of the human race (50).

99.99% of all species that have inhabited the Earth are extinct; the average species lifespan is 2 Myr. How do we communicate the implications which follow from these truths? How many will grasp that sound global threat mitigation strategies require unprecedented, largely redirected international cooperation? 'Studies of mass extinctions tend to emphasize the sheer scope of the carnage. But the subtle differences between the species that died and those that survived can be crucial' [51] (24).[$]

Villa Rosa, Malta, Easter Monday, 2010

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[$] But perhaps it is only in England and America that it is possible to be so unconscious… The earth heaves and no one but is aware of the rumblings. There is not just a matter of… '[economic] troubles'; but of life and death, of starvation and existence (52).